

# **Texas 2014 Ebola Response, Lessons Learned and Next Steps**

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# Ebola Background

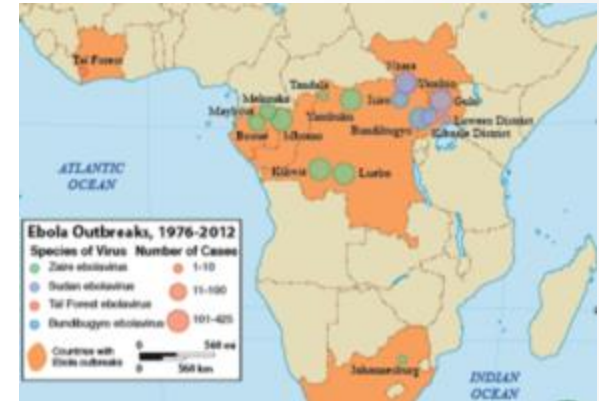


- Discovered in 1976 near the Ebola River in what is now the Democratic Republic of the Congo
- Causes Ebola hemorrhagic fever
- Likely carried by bats; Cause disease in humans and nonhuman primates (monkeys, gorillas, and chimpanzees)
- Five identified Ebola virus species, four of which are known to cause disease
  - Ebola virus (*Zaire ebolavirus*)
  - Sudan virus (*Sudan ebolavirus*)
  - Tai Forest virus (*Tai Forest ebolavirus*, formerly Côte d'Ivoire ebolavirus)
  - Bundibugyo virus (*Bundibugyo ebolavirus*)
  - Reston virus (*Reston ebolavirus*)

# West Africa Ebola 2014-2015

## 1976-2013 Outbreaks

- 24 previous outbreaks
- 2,400 cases
- 1,597 deaths, 66% case fatality ratio
- Largest single outbreak, 2000-2001, Uganda, 425 Cases, 224 Deaths (53%)



## 2014-2015 Outbreak

- >10 times larger than all previous Ebola outbreaks combined
- 26,290 cases
- 10,890 deaths, 41% case fatality ratio

*Data current as of 1 May 2015*







Irish Aid  
Department of Communities and Social Equality  
An tAidís (Irish Aid) Eanáir 2014

# EBOLA

## Signs and Symptoms



If You Have Fever, Diarrhoea and Vomiting With or Without Bleeding  
**GO IMMEDIATELY TO THE NEAREST HEALTH FACILITY**  
For more information call 117 (Call free)



**Ebola 2014**  
**West Africa**





# **Ebola 2014**

## **International**

# U.S. Diagnosed Ebola Cases = 4

**On September 30, 2014, first Ebola case diagnosed in the United States**

- **Traveler from Liberia to Dallas, Texas**
- **Patient died on October 8**

**On October 10, Dallas healthcare worker tested positive for Ebola**

- **Patient recovered and discharged from the NIH Clinical Center on October 24**

**On October 15, second Dallas healthcare worker tested positive for Ebola**

- **Patient recovered and discharged from Emory Hospital on October 28**

**On October 23, the New York City Department of Health and Mental Hygiene reported a case of Ebola**

- **Medical worker returned to New York City from Guinea after serving with Doctors Without Borders**
- **The patient recovered and was discharged from Bellevue Hospital Center on November 11**

# Ebola Disease Progression



**First  
symptoms**

**Day 7-9**

Headache,  
fatigue, fever,  
muscle  
soreness



**Day 10**

Sudden high  
fever, vomiting  
blood, passive  
behavior



**Day 11**

Bruising, brain  
damage,  
bleeding from  
nose, mouth,  
eyes, anus



**Final  
stages**

**Day 12**

Loss of  
consciousness,  
seizures,  
massive internal  
bleeding, death

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Source: U.S. Centers for Disease and Control, BBC

Graphic: Melina Yingling

# First Diagnosed Ebola Case in North America

- **Thomas Eric Duncan, 42 years old**
- **September 19, Departs Liberia**
- **September 20, Arrives in Dallas, Texas**
- **September 24, Onset of symptoms**
- **September 25, Seeks care**
  - **Receives antibiotics**
- **September 28, Admitted to ICU**
- **September 30, Confirmed Ebola Virus Disease (EVD)**
- **October 8, Duncan dies**
- **Diverse contacts**





# First Nurse Diagnosed

- 26 year old nurse
- Cared for Mr. Duncan
- October 8, Duncan dies
- October 11, Nurse tests EVD positive
- October 16, Transferred to NIH facility in Bethesda, Maryland
- October 24, Discharged
- Limited contacts



# Second Nurse Diagnosed

- 29 year old nurse
- Cared for Mr. Duncan
- October 8, Duncan died
- October 10, nurse flew to Cleveland
- October 13, Flew back to Dallas
  - Was self-monitoring and reporting her temperature
  - Called the CDC, Temp 99.5F (37.5C)
  - CDC testing criteria is 100.4F (38C)
- October 15, Tests positive for EVD and transferred to Emory in Atlanta
- October 28, Discharged
- Large number of contacts



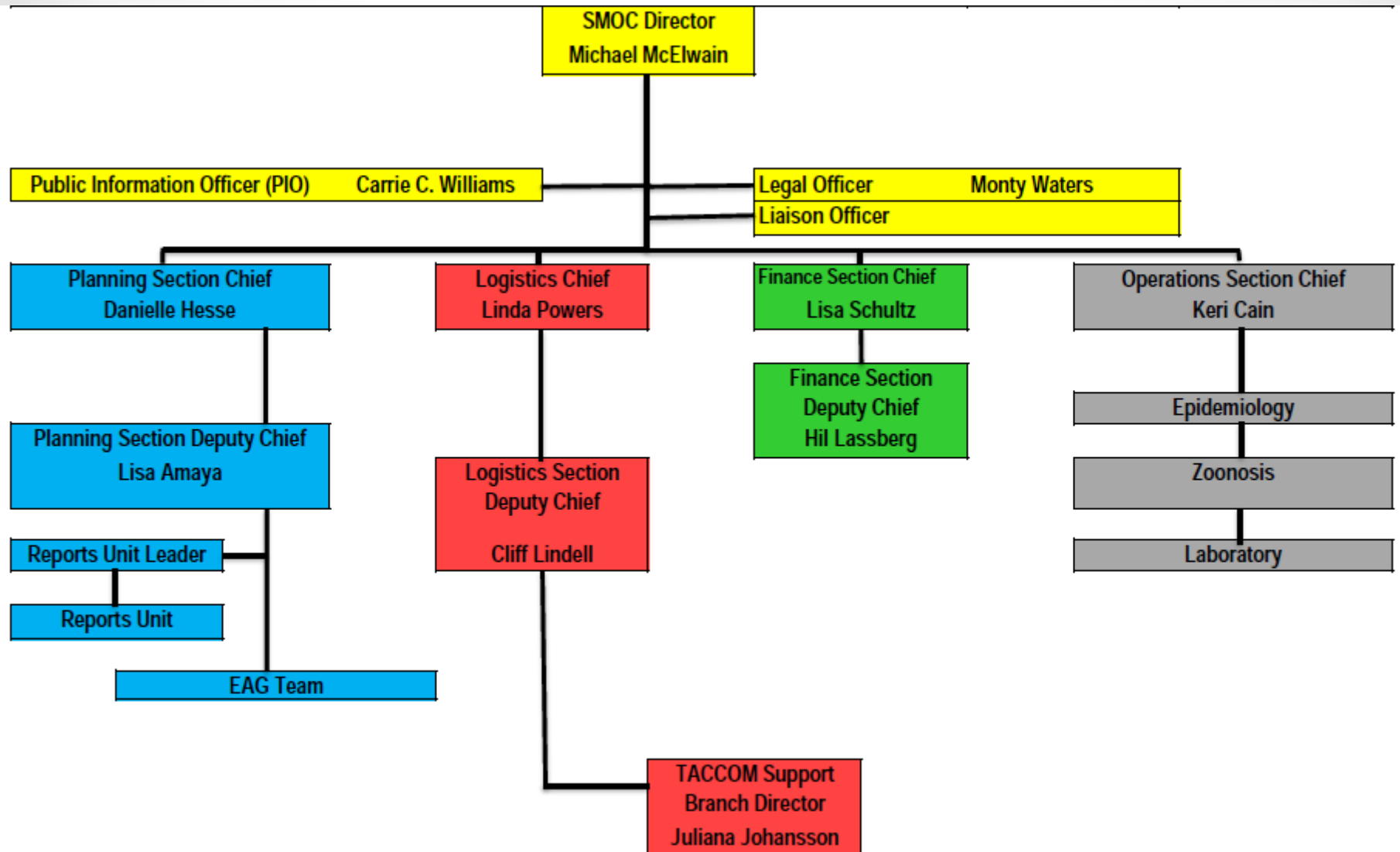
# Situational Awareness

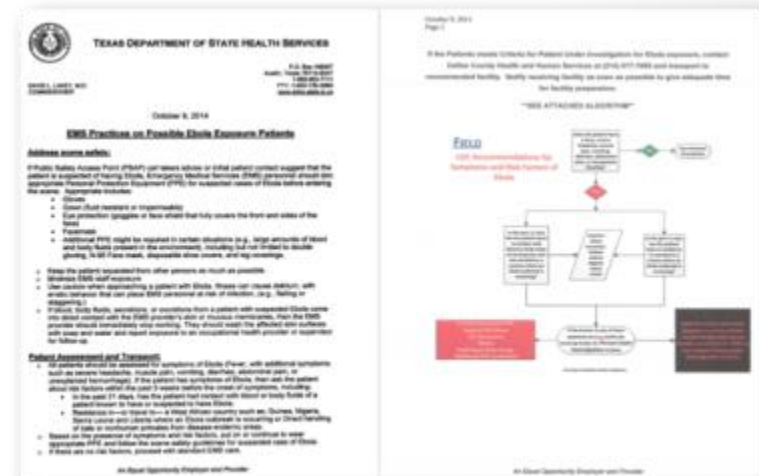
- **Response operations in Dallas**
- **Rapidly changing**
- **State Medical Operations Center (SMOC)**
  - Response Operations
  - Programmatic Operations
- **Emergency Management**
  - State Operations Center (SOC)
  - Disaster District Committee (DDC)
- **WebEOC**





# Texas State Medical Operations Center (SMOC) ICS Structure





# PPE Debate

**“In western Africa now there is a need for rational and efficient use of protective equipment... achieved by communicating a consistent message that the disease is essentially transmitted through direct contact. In control of infectious diseases, more is not necessarily better and, very often, the simplest answer is the best.”**

*Martin-Moreno, JM, Llinás, G, and Martínez Hernández, J. Is respiratory protection appropriate in the Ebola response?. Lancet. 2014; 384: 856*





# PPE Debate

**The scientific community must argue for the most conservative infection control responses that make sense in light of the present data. I believe the authors (Previous Slide) and the Centers for Disease Control and Prevention have failed to do that and in so doing, have imperiled individuals unnecessarily.**

*Ryschon TW. Ebola control measures and inadequate responses. Lancet. 2014; 384 (9949): 1181–1182, 27*





# Updated CDC PPE Recommendations



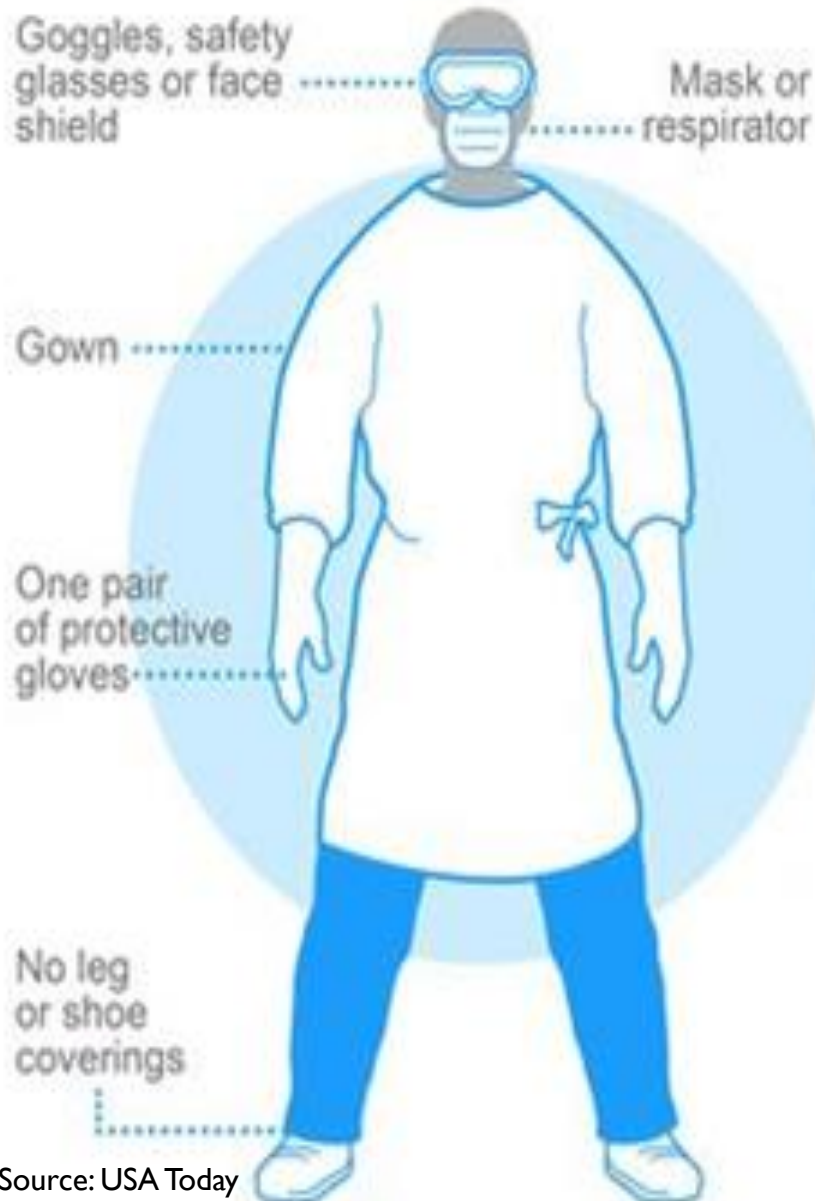
## Key Highlights

- Repeated infection control training for all healthcare workers involved in the care of an Ebola patient
- Recommended PPE should have no skin exposed
- Upgrade to N95 or PAPR
- Identified onsite manager and trained observers

***NOTE: Highlights added by presenter***

# CDC'S PROTECTIVE GEAR CHANGES FOR HEALTH WORKERS

## PREVIOUS GUIDELINES



## NEW GUIDELINES





# Response Challenges: Ground Transportation

- Index patient transport not informed
- Requires pre-planning and advanced training
- 911 Public Safety Answering Points
- **Must establish:**
  - Appropriate PPE
  - Appropriate competency to utilize PPE
- **Known vs unknown risk**
- **Risk stratified**
  - Head to toe impermeable barriers with the powered air purified respirators
  - N95, goggles, and Tychem full body fluid impermeable suit



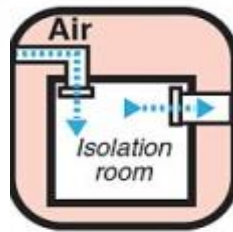
# Response Challenges: Air Transportation

- Requires pre-planning and advanced training
- Establish infection control protocols in advance and implement throughout the process
- Training must include
  - Clinical management
  - Infection control
  - Personal protective equipment (PPE)
- Portable Isolation unit recommended

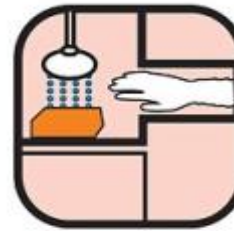


# Ebola Treatment Centers

## Nebraska Medical Center Example



- Negative air flow with greater than 15 air exchanges per hour



- Pass through sterilizer to disinfect materials leaving the unit



- High-Efficiency Particulate Air (HEPA) filtration system



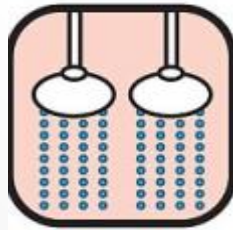
- Dunk tank to decontaminate lab specimens leaving the unit



- Secured access, separate staff entrances and exits



- Close proximity to the Nebraska Public Health Biosafety 3 Laboratory



- Staff decontamination shower



- HEPA patient transport system



# Waste Management

- **Not a public health area of expertise**
- **Cleaning the apartment**
  - How to clean
  - Identifying waste
- **Packaging waste**
  - Procedures
  - Supplies & equipment
- **Transportation**
  - Federal DOT Permit Category A Infectious Substance
- **Destruction**
  - Incineration & ash



# Waste Management

## Category A Infectious Waste

- From a healthcare setting:
  - Regulated medical waste
  - Properly packaged and labeled
  - State-registered transporters
  - Authorized disposal facilities
- From a non healthcare setting (e.g. residential, hotel, etc.)
  - Classified as special waste and managed as medical waste



# Waste Management

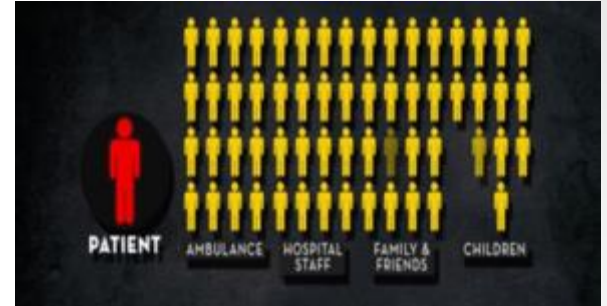
## Category A infectious waste treatment methods:

- **Autoclave:** waste placed in pressurized steam
- **Incineration:** Extremely high temperatures, well above the relatively low temperatures needed to kill Ebola virus
- *NOTE: Chemical treatment methods in the US not yet standardized for Category A waste*



# Contact Tracing

- **Index patient & nurse contacts**
  - 177 healthcare worker and community contacts
    - 43 index patient contacts prior to hospitalization
  - 165 contacts on flights with Nurse #2
    - Texas, Ohio, and New York
  - All cleared by November 7<sup>th</sup>, after 21 day monitoring period
- **Highlighted the need for:**
  - More epidemiologists
  - More field epidemiology expertise
  - Better information sharing systems



Dallas County chief epidemiologist Dr. Wendy Chung, far right, and members of her team—from left, Sonya Hughes, Emily Hall, and Sibeso Joyner



# Pets and Ebola

- Pet issues in recent disasters
- Outcry - Spanish nurse's dog
- Poorly understood Ebola risk
- Protocols were non-existent
- Dallas Nurse's small dog
  - Transported to Hensley Field, Decommissioned Naval Air Station
  - 21 day quarantine
  - Texas A&M vet providers
- Recommendation: Those being monitored for EVD should avoid pets



# Control Orders

**Control orders issued for:**

- **People**
- **Places**
- **Pets**
- **Possessions**

**Challenges include:**

- **Resistance**
- **Frustration**
- **Housing, food and other basic needs**



# Sample Control Order Message

**“Under the authority of Texas [law] you are hereby ordered...to prevent the introduction, transmission, and spread of this disease in this state:”**

**“Remain at [ADDRESS]. You will not be permitted to leave...”**

**“You are not to allow or otherwise permit any visitors...”**

**“Monitor yourself for symptoms ...”**

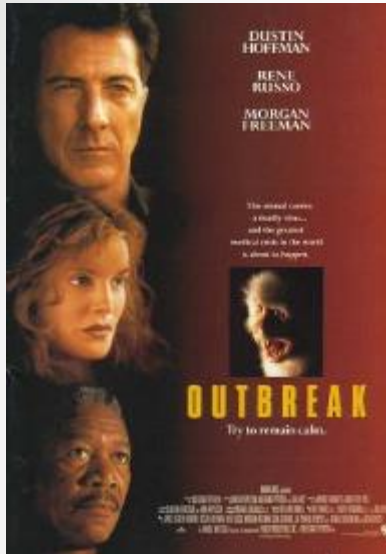
**“Make yourself available...for diagnostic testing...”**

**“If you do not comply with these control measures you may be subject to criminal prosecution...”**

**This Order will remain in effect until you are notified in writing that the incubation period has passed**



# Public Perception





# Erroneous Public Perceptions

- Inflated Ebola risk
- Conspiracy Theories
- Racism Accusations
- Overreactions

News Headline, “Schools in Ohio, Texas closed over Ebola fears”



In Belton, Tex., on Friday, environmental workers prepared to disinfect North Belton Middle School, which had been closed **because of the Ebola scare.**

*Credit Rusty Schramm/The Temple Daily Telegram, via Associated Press*

# Behavioral Health Interventions



## Issues

- **Diverse psych needs of the public, infected patients, family members, healthcare workers, and other responders**
- **Distress with perceived or actual exposure (Psychological First Aid)**
- **Grief counseling**
- **Involuntary control orders**
  - Including a homeless individual

# Behavioral Health Interventions



## Lessons Learned

- Early integration of a behavioral health response
- Consensus on sharing sensitive health information
- Recognition that infectious disease disasters can change the usual response framework and process
- Develop homeless population contingency plans
- Interagency collaboration to develop an overall behavioral health treatment plan

# Fatality Management

## Post-mortem Checklist

### • Phase I

- Notify next of kin, State Health Commissioner, and local elected officials

### • Phase II

- Additional notifications and mortuary services procedures initiated

### • Phase III

- Coordinate press release

Event(s)	Responsible for Notification	Comments
<b>Phase I</b>		
Patient expires		
Notification of next of kin (NOK)	Hospital	Escort primary NOK, received notification before contacting other NOK
DSHS Commissioner receives notification	Hospital	
Dallas County Judge receives notification	Hospital	
City Mayor receives notification	DSHS Commissioner	
State notification: (A) DSHS Management (B) Governor	DSHS Commissioner	
<b>Phase II</b>		
Confirm NOK contacted	Dallas County Judge	
Dallas County Medical Examiner receives notification	Dallas County Judge	Or after hours on duty backup
Dallas County Health and Human Services Director receives notification	Dallas County Judge	
Dallas County Office of Homeland Security receives notification	Dallas County Judge	Duty Officer
Confirm ME issuance of cremation waiver	Dallas County Judge Staff	
Delivery of signed DSHS Control Order to Hospital	DSHS Commissioner Staff	
Mortuary Service receives notification	DSHS Staff	Provide mortuary services with NOK information
Notification to law enforcement for escort	Dallas County Judge	To escort mortuary services vehicle from the hospital to crematorium
Delivery of signed Control Order to Mortuary Services	Hospital	
Mortuary Services post mortem procedures: 1. Body removed from hospital 2. Body transported 3. Body cremation 4. Notification at start of and completion of cremation to DSHS Commissioner 5. Disposition of ashes	Mortuary Services	<ul style="list-style-type: none"> <li>• Mortuary Services follow CDC guidance for handling body</li> <li>• Movement of body from hospital (escort by LE)</li> <li>• follow CDC guidance for cremation of body</li> </ul>
Notification to Mortuary Services of NOK desire for disposition of ashes	Hospital	If unable to determine at this time, Mortuary Services will follow up with NOK
<b>Phase III</b>		
Develop and finalize Press Release statement		Coordination of agencies
<ul style="list-style-type: none"> <li>• Hospital Press Release</li> <li>• Notification: (A) Org. (B) PIOs</li> <li>• Dissemination of statement and Press Releases</li> </ul>	DSHS Dallas (city) Dallas County DSHS Commissioner Dallas County Judge	



# Fatality Management

- **Mr. Duncan's body was "double-bagged" in zippered bags (CDC Policy)**
- **Bioseal bag was added by Texas-based Global Mortuary Affairs (mortuary contractor)**
  - Approved for air transport of un-embalmed remains
  - Assures no leaks are possible
  - Biosafety Level 4 (BSL-4) approved
  - Costs about \$65 per bag
- **Cremation**
  - Placed directly into the retort and incinerated
  - Duncan's cremains were sealed into a BioSeal pouch for presentation to the family.
- **Legal issues of cremains possession**

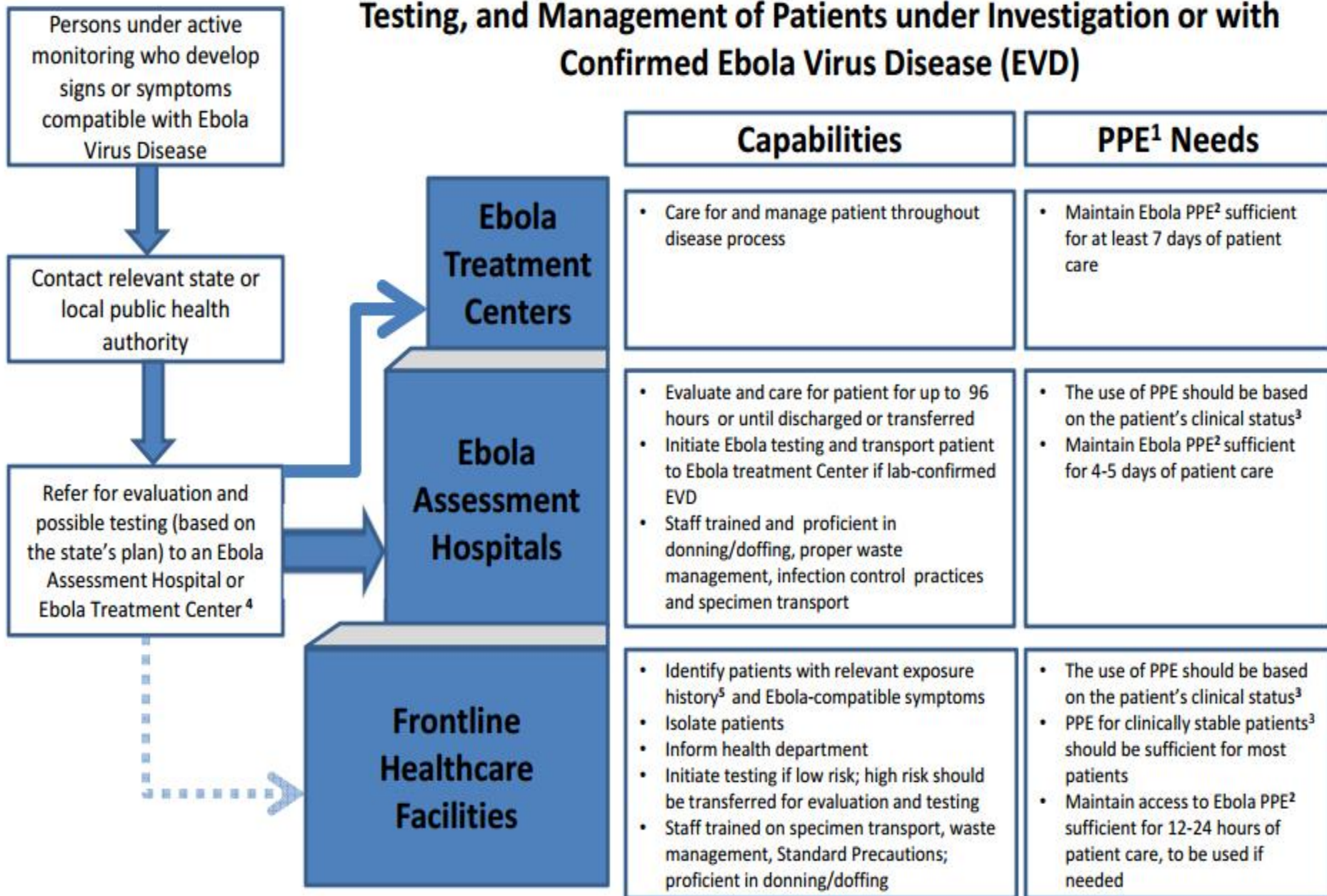


# Texas Monitoring Travelers from West Africa

Currently under Monitoring		No Longer being Monitored		Total Assigned to Texas to Date
Low Risk	High/Some Risk	Number Transferred Out of State	Number Completed Monitoring	
65	4	102	358	529

Data as of 04/05/2015

# Interim Guidance for Hospital Preparedness for Evaluation, Testing, and Management of Patients under Investigation or with Confirmed Ebola Virus Disease (EVD)



# Next Steps

- **Ongoing Traveler Monitoring**
- **Public Health Capacity and Coordination**
- **Healthcare Systems Concept of Operations (CONOPS)**
- **Hospital Readiness and Capabilities**
  - Planning, Training, Exercises, PPE
- **Hospital Infrastructure**
  - Infection Control, Patient Flow, Waste Management
- **EMS and 911 Systems Preparedness**



# Conclusion

- **Ebola posed unique challenges**
- **Lessons and practices inform future responses**
- **What we knew October 2014 is changing**
  - Numerous protocols now exist
  - Expanded planning, training, and exercise activities
- **Core public health practices were effective in controlling the spread of Ebola Virus in the U.S.**
- **More information:**
  - Centers for Disease Control and Prevention, [www.cdc.gov/vhf/ebola/](http://www.cdc.gov/vhf/ebola/)
  - Texas Department of State Health Services, [www.texasebola.org](http://www.texasebola.org)
  - Texas Infectious Disease Readiness, <http://txidr.org/>